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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,582	02/22/2001	Eiji Okamoto	9319S-000178	9306
7590 08/23/2005			EXAMINER	
Harness Dickey & Pierce PO Box 828 Bloomfield Hills, MI 48303			QI, ZHI QIANG	
			ART UNIT	PAPER NUMBER
			2871	
DATE MAILED: 08/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/763,582

Applicant(s)

OKAMOTO ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-15 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-15 and 24-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 5, 2005 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 08313890 (Hidenori et al) in view of US 6,229,586 B1 (Data et al), US 5,220,444 (Mitsui et al) and US 5,850,276 (Ochi et al).

Regarding claims 1, 3 and 24-27, Hidenori discloses (abstract; Fig.9; paragraphs 0086 – 0090) that a substrate (TFT substrate 49) for a liquid crystal display wherein:

(concerning claim 27)

- the substrate (49) having lower surface (first surface) and upper surface (second surface) opposite the lower surface (first surface);

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- the upper surface of the substrate having a planar region (flat area 50), and a roughened region (roughened area 51), the roughened region comprising microscopic peaks and valleys, and the planar region adjacent the roughened region (see Fig.9B);
- the heights of the tops of the peaks in the roughened region (51) are equal to or less than the plane of the planar region (50) (shows on the Fig.9B);
- a reflective board (52) (reflecting film) is formed on the roughened region (51) (see paragraph 0089);
- the surface of the reflective board (52) (reflecting film) corresponding to the microscopic peaks and valleys of the roughened region (51), and resulting in a predetermined scattering characteristics during light reflection (see Figs.9B and 9C);

(concerning claim 24)

- because the substrate having roughened region and planar region, and the roughened region having microscopic peaks and valleys, so that the roughened region has a network-shaped; and forming such roughened region and planar region must use at least two compositions such as using photoresist and metal reflective layer to form such roughened region and the planar region.

Hidenori does not expressly disclose that a predetermined mark (metal film) (alignment mark) is formed on the planar region, and the reflecting film and the

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alignment mark using same metal film, and the alignment mark is separated from the reflecting film.

Regarding alignment mark formed on planar region, Date discloses (col.2, lines 57 – 63) that the surface of the substrate is made flat (planar) in the alignment mark forming region, i.e., the alignment mark is formed on the planar region. Date further indicates (col.2, line 64 – col.3, line 3) that when the substrates are overlaid on each other, the alignment mark is easily recognized because many depressions and projections are not formed on the surface of the substrate in the alignment mark-forming region.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori with the teachings of forming alignment mark on the planar region of the substrate as taught by Date in order to recognize the alignment mark easily when bounding the substrates together, since many peaks and valleys are not formed on the planar region (see col.2, line 64 – col. 3, line 3).

Hidenori and Date lack that the predetermined mark (alignment mark) made of metal film and the reflecting film made of the same metal film.

Regarding alignment mark and the reflecting film made of same metal, Mitsui discloses (col.1, line 40 – col.5, line 42; Figs.6, 8) that the flattened surface of the substrate (11) is covered with a metal layer such as an Ag (silver) layer (functions as alignment mark), and forming a metal thin layer on the uneven surface such as an Ag (silver) layer functions as reflecting film (see col.3, lines 19-21, that is same metal), such

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that the optical characteristics improved and the economy in production obtained (see col.2, lines 18-22). As a general available knowledge, the alignment mark should be visible and using metal such as aluminum having higher reflectivity would enhance the visibility.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori and Date with the teachings of using same metal formed on the planar region and formed on the roughened region as taught by Mitsui for improving the optical characteristic and obtaining the economy in production, since the metal such as aluminum providing improved optical characteristics for the reflective-type liquid crystal display (col.2, lines 18-23).

Hidenori, Date and Mitsui lack that the alignment mark is separated from the reflection film.

Regarding the alignment mark is separated from the reflecting film, Ochi discloses (col.6, lines 18-28; Figs.1-2) that the alignment marks (26 and 25) are provided on the non-display area (20B) are separated from the display area (20A). As a general available knowledge, the reflecting film is contributed to display image such as reflecting pixel electrode and is connected with wiring layers to apply signal, and the reflecting film must be provided in the display area. Ochi indicates (col.3, lines 44-48) that using alignment marks as a reference to align the two substrates, the pixel slit opening rate is improved (since the alignment marks are provided on the non-display

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area). Therefore, the alignment mark is separated from the reflecting film would improve the pixel slit opening rate so as to enlarge the display area (see col.3, lines 44-48).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori, Date and Mitsui with the teachings of arranging the alignment mark separated from the reflecting film as taught by Ochi for enlarging the display area, since the alignment mark is separated from the reflecting film would improve the pixel opening rate (see col.3, lines 43 – 48).

Regarding Claim 5, Hidenori discloses (Fig.9; paragraph 0089) that the wiring is formed on the flat area (50), i.e., a planar region.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hidenori, Date, Mitsui and Ochi as applied to claims 1, 3, 5 and 24-27 above, and further in view of US 6,315,801 (Miyazaki et al).

Regarding claim 4, Hidenori, Date, Mitsui and Ochi teach the invention set forth above. Hidenori, Date, Mitsui and Ochi lack that the predetermined mark is a process control mark.

Miyazaki discloses (col.2, line 58 – col.3, line 15) that during mass production having several process (the process can be used in production of electrode plate or production of a liquid crystal display device), and in order to effectively perform these processes with high accuracy, it is available to apply process control marks, position alignment marks and apply various identification marks such as manufacture lot numbers, bar codes and the like for easy identification and manufacture control (see col.2, line 64 – col.3, line 3) .

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Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori, Date, Mitsui and Ochi with the teachings of arranging a process control mark as taught by Miyazaki for achieving effectively perform the production process with a high accuracy, since such identification marks would easier identify and control the manufacturing process (see col.2, line 64- col.3, line 3).

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hidenori, Date, Mitsui and Ochi as applied to claims 1, 3, 5 and 24-27 above, and further in view of US 5,973,763 (Fujimura et al).

Regarding claim 6, Hidenori, Date, Mitsui and Ochi teach the invention set forth above. Hidenori, Date, Mitsui and Ochi lack that a sealant is formed in the planar region.

Fujimura discloses (col.1, lines 13- 30) that, generally, the first substrate and the second substrate are bounded though a seal material, and then the two substrates are adhered together by a certain pressure. Therefore, if the sealant is formed in a roughened region, the two substrates would be insufficiently sealed; and the sealant is formed in a planar region, the two substrates would be able to obtain a hermetical seal by a certain pressure. It is common and known in the art to form a sealant in a planar region as sealing the two substrates in a planar region would be easier to obtain a sufficient adhesion.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori, Date, Mitsui and Ochi with the teachings of arranging the sealant in the planar region as taught by Fujimura for

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achieving a hermetical seal, since bounding the two substrates by pressure through sealant (see col.1, lines 13- 30).

5. Claims 7-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidenori, Date, Mitsui and Ochi as applied to claims 1, 3, 5 and 24-27 above, and further in view of US 6,130,736 (Sasaki et al).

Regarding claims 7-13, Hidenori, Date, Mitsui and Ochi teach the invention set forth above. Hidenori, Date, Mitsui and Ochi lack that the maximum height R_y , the arithmetic mean roughness R_a , the ten-point average roughness R_z , and the mean wavelength S_m in the roughness region are in predetermined ranges, and the ranges are set as claimed.

Sasaki discloses (col.2, line 50 – col.7, line 59; col.8, line 33 – col.9, line 50; Fig.1) that the reflector member (15) having a surface roughness of $1\text{ }\mu\text{m}$ or less and a width of the concave portion is $45\text{ }\mu\text{m}$ or less (col.9, lines 47-50). Therefore, the roughened region must have a certain range to represent the roughness. Sasaki discloses (col.6, lines 51-65) that in accordance with the reflector having such corrugated surface, the reflecting efficiency is improved and a bright display screen is attained, and the reflecting direction can be set in a wider range. A certain roughness (such as the arithmetic mean roughness R_a) would determine the maximum height of roughness R_y , the ten-point average roughness R_z , and the mean wavelength (i.e., the pitch of the roughness peak) S_m . Sasaki discloses (col.9, lines 33-50) that it is more preferable to set the surface roughness of the reflector at $1\text{ }\mu\text{m}$ or less, i.e., the arithmetic mean roughness R_a is set at $1\text{ }\mu\text{m}$ or less.

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Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the substrate structure of Hidenori, Date, Mitsui and Ochi with the teachings of the surface roughness range as taught by Sasaki to develop a proper roughness value in order to obtain a proper reflection and scattering so as to improve the display quality, since the reflector having such corrugated surface, the reflecting efficiency is improved (see col.6, lines 51-65).

Regarding claims 14-15, the limitations are only given weight as intended use. Because any liquid crystal display device would comprise two substrates and a liquid crystal layer interposed between the two substrates; and any display can be used for any electronic apparatus, and that would have been at least obvious.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 3-15 and 24-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
Patent Examiner


ROBERT KIM
SUPERVISORY PATENT EXAMINER